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Journal of the Society of Arts.

FRIDAY, MARCH 13, 1863.

SOCIETY OF ARTS EXAMINATIONS, 1863.—NOTICE TO LOCAL BOARDS.

The attention of Local Boards is particularly called to Par. 14 of the Examination Programme, as follows :—

14. The previous Examinations must be held by the Local Boards sufficiently early in the year 1863 to allow the results to be communicated to the Council, on a Form which will be furnished on application (see Form No. 2 in Appendix, page 11), on or before the 1st April, when the required number of copies of Form No. 4 will be forwarded to each Local Board. These should be filled up and returned by the 7th April, *i.e.*, four weeks before the commencement of the Final Examinations.

Any Local Boards expecting to have candidates desiring to be examined in Music, should apply to the Secretary of the Society of Arts without delay, who will furnish them with a form of test to be used at the Previous Examination in that subject, as explained in Par. 111 of the Programme.

THE SOCIETY'S MEMORIAL OF THE PRINCE CONSORT.

The following circular, with an abstract of the proceedings of the General Meeting held on the 7th Feb., has been issued to the members:—

Society of Arts, Adelphi, London, W.C., Feb., 1863.

Sir,—I am directed to bring to your notice the subjoined proceedings of a Special General Meeting of this Society, held on Saturday, the 7th instant.

Should you desire to have your name placed on the list of subscribers, I shall feel obliged by your filling in the accompanying paper, and returning it to me, with your subscription, which may be in the form of a post office order or cheque, made payable to the Financial Officer, Mr. Samuel Thomas Davenport, and crossed Coutts and Co. I am, Sir, your obedient servant,

P. LE NEVE FOSTER, *Secretary*.

The subscription of each member is limited to one guinea.

The following is the list of subscribers up to the 12th inst. :—

Adams, Thomas	£1	1	0
Adams, George G.	1	1	0
Adams, George William	1	1	0
Addington, Right Hon. Henry Unwin	1	1	0
Adley, Charles Coles	1	1	0
Akroyd, Edward	1	1	0
Alger, John	1	1	0
Allen, Thomas	1	1	0
Ames, John	1	1	0
Anderton, James	1	1	0
Andrew, W. P.	1	1	0
Artingstall, George	1	1	0
Atkinson, William	1	1	0
Austin, James	1	1	0
Avery, Thomas Charles	1	1	0
Bacon, Jacob Perkins	1	1	0
Bagnall, Charles	1	1	0
Balleras, Guillermo Esteban	1	1	0
Barber, Charles	1	1	0
Barry, Dykes	1	1	0
Bartlett, William E.	1	1	0
Baylis, W. Henry	0	10	6
Beckwith, Edward Lonsdale	1	1	0
Belcher, Rear-Admiral Sir Edward	1	1	0
Bell, John	1	1	0
Bentley, Robert J.	1	0	0
Best, Hon. and Rev. Samuel, M.A.	1	1	0
Beyer, Charles F.	1	1	0
Birkett, John	1	1	0
Bischoff, James	1	1	0
Black, Alexander	1	1	0
Blagden, George	1	1	0
Blaine, Delabere Roberton	1	1	0
Bodkin, William Henry	1	1	0
Boileau, Sir John P., Bart., F.R.S	1	1	0
Bosanquet, George Jacob	1	1	0
Bowley, Robert K.	1	1	0
Boyd, James	1	1	0
Braby, Frederick	1	1	0
Brassey, Thomas	1	1	0
Breillat, E.	1	1	0
Bremner, Samuel	1	1	0
Brett, John W.	1	1	0
Brickwood, John Strettell	1	1	0
Bright, Sir Charles	1	1	0
Broad, Robert	1	1	0
Brook, Charles	1	1	0
Brooke, Charles, F.R.S.	1	1	0
Brooke, John	1	1	0
Brookes, William	1	1	0
Brooks, Henry	1	1	0
Browell, Edward M.	1	1	0
Brown, Henry	1	1	0
Brown, Sir William, Bart.	1	1	0
Browne, Edward	1	1	0
Budgett, John P.	1	1	0
Burgoyne, Gen. Sir John F., Bart., G.C.B., F.R.S.	1	1	0
Burton, William S.	1	1	0
Cama, M. H.	1	1	0
Candy, Charles	1	1	0
Caplin, Madame R. A.	1	1	0
Champion, Percival	1	1	0
Chance, Robert Lucas	1	1	0
Charlton, Henry	1	1	0
Chater Joseph	1	1	0
Chester, Harry	1	1	0
Christie, Robert Monro	1	1	0
Clabon, John M.	1	1	0
Clutton, John	1	1	0
Cock, John, Junr.	1	1	0
Coghlan, H. T.	1	1	0
Cole, Henry, C.B.	1	1	0
Cooper, William	1	1	0
Cope, Walter	1	1	0
Corbett, John	1	1	0
Corderry, Edward	1	1	0
Cosens, Frederick W.	1	1	0
Coulson, William	1	1	0
Courtauld, Samuel	1	1	0
Creed, Henry	1	1	0
Critchett, Charles (Assistant Secretary)	1	1	0
Cubitt, William	1	1	0
Cullingford, W. H.	1	1	0
Curling, Joseph	1	1	0
Crawford, Robert Wygram, M.P.	1	1	0
Darby, Abraham	1	1	0
Davenport, Samuel Thomas (Financial Officer)	1	1	0
Davidson, Thomas	1	1	0
Dawbarn, George	1	1	0
Dawbarn, Richard W.	1	1	0

Dawbarn, Robert	1	1	0
Dawson, Henry	1	1	0
Day, William	1	1	0
Debary, Peter Francis	1	1	0
Dickson, Peter, F.R.G.S.	1	0	0
Dilke, Sir C. Wentworth, Bart.	1	1	0
Dilke, Charles W.	1	1	0
Dines, George	1	1	0
Dix, Thomas	1	1	0
Dixon, Thomas	1	1	0
Docker, F. W.	1	1	0
Dowleans, A. M.	1	1	0
Drax, J. S. W. S. Erle, M.P.	1	1	0
Dunn, Thomas	1	1	0
Dutton, William C.	1	1	0
Eamonson, Joshua J.	1	1	0
Eastham, John	1	1	0
Easton, James	1	1	0
Easton, Percy Shand	1	1	0
Ebury, Lord	1	1	0
Elliot, William Henry Fletcher	1	0	0
Ellis, William	1	1	0
Ethelston, Rev. Charles Wickstead, M.A.	1	1	0
Evans, E. Bickerton	1	1	0
Evans, Jeremiah	1	1	0
Ewart, William M.P.	1	1	0
Faraday, Michael, D.C.L., F.R.S.	1	1	0
Faulkner, John, Junr.	1	1	0
Fauntleroy, Robert Thomas	1	1	0
Field, John	1	1	0
Field, William	1	1	0
Foley, Lord	1	1	0
Fordham, Thomas	1	1	0
Foster, P. Le Neve (Secretary)	1	1	0
Fox, Sir Charles	1	1	0
Fowler, Robert N.	1	1	0
Freer, Rev. Richard Lane, D.D.	1	1	0
Fussell, Alexander	1	1	0
Garling, Henry	1	1	0
Geeves, William	1	1	0
Gilbart, James William, F.R.S.	1	1	0
Goding, Charles	1	1	0
Godwin, George, F.R.S.	1	1	0
Gonzaga, H. S. H. the Prince Alexander of, and Duke of Mantua	1	1	0
Gooch, Joseph H.	1	1	0
Gooch, Thomas	1	1	0
Goode, Thomas	1	1	0
Gordon, Col. W. J., C.B., R.E., D.A.G.	1	1	0
Gould, Charles Augustus	1	1	0
Graham, Peter	1	1	0
Graham, Thomas, D.C.L., F.R.S.	1	1	0
Graham, William	1	1	0
Grant, Alexander	1	1	0
Grey, Major-General the Hon. Charles	1	1	0
Grove, W. R., Q.C., F.R.S.	1	1	0
Gruneisen, Charles Lewis	1	1	0
Hack, Thomas	0	10	6
Haden, F. Seymour, F.R.C.S.	1	1	0
Hall, Walter	1	1	0
Hamilton, Edward	1	1	0
Hamilton, Sir Robert N. C., Bart.	1	1	0
Hammond, William Parker	1	1	0
Hancock, James Lyne	1	1	0
Hancock, Frederick William	1	1	0
Hanhart, Michael	1	1	0
Hannay, John	0	10	6
Hannay, Robert	1	1	0
Hannay, Robert, Jun.	0	10	6
Hannay, Thomas	0	10	6
Hannington, C. S.	1	1	0
Harrison, Henry	1	1	0

Harrison, Thomas E., C.E.	1	1	0
Hawes, William	1	1	0
Hawkshaw, John, F.R.S.	1	1	0
Hayward, T. Carlyle, Jun.	0	10	6
Headland, Edward	1	1	0
Heane, Henry	1	1	0
Heather, James	1	1	0
Hereford, the Dean of	1	1	0
Heymann, Lewis	1	1	0
Heywood, James	1	1	0
Hick, John	1	1	0
Hicks, Thomas	1	1	0
Hollins, Michael Daintree	1	1	0
Holmes, Alfred William	1	1	0
Holmes, Herbert Mountford	1	1	0
Holmes, James	1	1	0
Hooper, Bartlett	1	1	0
Horton, Isaac	1	1	0
Horton, John	1	1	0
Howard, Thomas	1	1	0
Imhof, Daniel	1	1	0
James, Jabez	1	1	0
Jewesbury, H. W.	1	1	0
Joel, Joseph	1	1	0
Johnson, Henry	1	1	0
Johnson, Jabez	1	1	0
Jones, James W.	1	1	0
Jones, Owen	1	1	0
Jones, Richard Lambert	1	1	0
Keeling, Herbert Howard	1	1	0
Kelk, John	1	1	0
Kemp, George T.	1	1	0
Khaznadar, S. E. le Général Moustapha, Premier Ministre de S.M. Tunisienne	1	1	0
Lacy, Henry Charles	1	1	0
Lambert, Thomas	1	1	0
Lawrence, Frederick	1	1	0
Larnach, Donald	1	1	0
Le Couteur, Col. John, F.R.S.	1	1	0
Leeks, Edward Frederick	1	1	0
Leighton, John, F.S.A.	1	1	0
Levi, Leone	1	1	0
Lewis, Stephen W.	1	1	0
Longstaff, G. Dixon, M.D.	1	1	0
Lucas, Thomas	1	1	0
Macarthur, Major-Gen. Sir Edward, K.C.B.	1	1	0
MacDonald, J. C.	1	1	0
Macfarlane, Walter	1	1	0
Maclaran, George	1	1	0
Maclea, Charles G.	1	1	0
Malcolm, Major-Gen. G. A.	1	1	0
Manby, Charles, F.R.S.	1	1	0
Marryatt, Joseph	1	1	0
Marsh, Matthew Henry, M.P.	1	1	0
Martin, John	1	1	0
Martin, Thomas	1	1	0
Martineau, David	1	1	0
Martyn, Silas Edward	0	10	6
Matthew, James	1	1	0
May, Harry	1	1	0
McMurray, William	1	1	0
Mechi, Alderman	1	1	0
Merle, William Henry	1	1	0
Middleton, David	1	1	0
Miles, Alfred W.	1	1	0
Mocatta, Benjamin	1	1	0
Moore, Charles	0	10	6
Morant, Robert	1	1	0
Moulton, Stephen	1	1	0
Muir, William	0	10	6
Mulready, William, R.A.	1	1	0

Munn, Major W. A.	1	1	0
Murchison, J. H.	1	1	0
Murchison, Sir Roderick Impey, K.C.B., D.C.L.	1	1	0
Napier, Robert	1	1	0
Navroji, Dádábhái	1	1	0
Newcombe, S. Prout	1	1	0
Noble, Matthew	1	1	0
Oldershaw, Capt.	1	1	0
Pagden, Stephen	0	10	6
Pakington, Sir John S., Bart., M.P.	1	1	0
Palmer, George	1	1	0
Paul, J. Michell	1	1	0
Pearce, Alfred B.	1	1	0
Penn, John	1	1	0
Petrie, Samuel	1	1	0
Pierce, William	1	1	0
Phelps, Charles	1	1	0
Phillips, Sir Thomas, F.G.S.	1	1	0
Potter, Thomas	1	1	0
Preller, C. A.	1	1	0
Price, Arthur J.	1	1	0
Proctor, John	1	1	0
Provis, William Alexander	1	1	0
Pryor, William S.	1	1	0
Quain, Richard, M.D.	1	1	0
Radstock, Lord	1	1	0
Ratcliff, Charles	1	1	0
Rawson, W. H. Jun.	1	1	0
Redgrave, Samuel	1	1	0
Reeve, Charles	1	1	0
Reeves, John Russell, F.R.S.	1	1	0
Reid, Lestock Robert	1	1	0
Reiss, James	1	1	6
Reveley, Henry W	0	10	0
Rivett, Joseph Cedric	1	1	0
Rixon, Alfred H.	1	1	0
Robb, Alexander	1	1	0
Roberts, Henry, F.S.A.	1	0	0
Rodocanachi, M. E.	1	1	0
Routledge, Thomas	1	1	0
Russell, Capt. G.	0	10	0
Russell, John	1	1	0
Russell, John James	1	1	0
Russell, John Scott, F.R.S.	1	1	0
St. David's, Bishop of	1	1	0
Salomons, Aaron	1	1	0
Salomons, David	1	1	0
Salt, Titus	1	1	0
Sargood, F. J.	1	1	0
Saul, G. T.	1	1	0
Schneider, Richard	1	1	0
Sedgwick, John Bell	1	1	0
Shearer, Bettesworth Pitt	1	1	0
Sheriff, G. W.	1	1	0
Shove, W. Spencer	1	1	0
Sibthorp, Henry, A. M. W.	1	1	0
Sich, Henry	1	1	0
Silverlock, H.	1	1	0
Simon, George	1	1	0
Simpson, William Butler	1	1	0
Smart, Sir George T.	1	1	0
Smith, George	1	1	0
Smith, George	1	1	0
Smith, J. Scott	1	1	0
Smith, R. M.	1	1	0
Smith, T. Mosdell	1	1	0
Sopwith, Thomas, F.R.S.	1	1	0
Spicer, Henry	1	1	0
Spicer, William Revel	1	1	0
Stanton, George	1	1	0
Stephens, Charles	1	1	0
Stephens, Henry	1	1	0
Stirling, Thomas	1	1	0
Stohwasser, Joseph	0	10	6
Straker, John	1	1	0
Styles, Thomas	1	1	0
Sugden, Samuel	1	1	0
Sulivan, Right Hon. Lawrence	1	1	0
Symonds, Capt. R.N.	1	1	0
Sykes, Col. W. H., M.P., F.R.S.	1	1	0
Taylor, George	1	1	0
Taylor, John	1	1	0
Teulon, Seymour	1	1	0
Thomas, John Evan, F.S.A.	1	1	0
Trevelyan, Arthur	1	1	0
Trevelyan, Sir Walter Calverley, Bart.	1	1	0
Trower, G. S.	1	1	0
Tuely, Nathaniel C.	1	1	0
Tueski, Moritz Paul	1	1	0
Tulloch, James	1	1	0
Turner, W. Shearman	1	1	0
Twining, Thomas	1	1	0
Underdown, E. M.	1	1	0
Unwin, George	0	10	0
Vandoni, Le Commandeur Comte de	1	1	0
Vane, Rev. John	1	1	0
Varley, Cornelius	0	10	6
Veitch, James	1	1	0
Vieweg, A. J.	1	1	0
Walker, Sir Edward S.	1	1	0
Watkins, Zachariah	1	1	0
Watney, Norman	1	1	0
Watson, Dr. J. Forbes, M.A.	1	1	0
Watson, Thomas	1	1	0
Webb, Charles Locock	1	1	0
Webb, Henry Bellamy	1	1	0
Webb, John	1	1	0
Webber, Henry	1	1	0
Whetham, Charles	1	1	0
Whitfeld, Henry	1	0	0
Willich, C. M.	1	1	0
Williams, Charles Wye	1	1	0
Williams, Walter	1	1	0
Williams, William	1	1	0
Wilson, G. Fergusson, F.R.S.	1	1	0
Wilson, W. Newton	1	1	0
Winkworth, Thomas	1	1	0
Woodd, Basil Thomas, M.P.	1	1	0
Wood, John	1	1	0
Wood, Vice-Chancellor Sir W. Page	1	1	0
Woodhouse, John Thomas	1	1	0
Woollams, Henry	1	1	0
Woolloton, Charles	1	1	0
Wright, Philip	1	1	0
Wyon, Joseph Shepherd	1	1	0
Wyon, Leonard C.	1	1	0
Yeats, John, LL.D., F.R.G.S.	1	1	0
Zaehnsdorf, Joseph	0	10	6
Zetland the Earl of	1	1	0

FOURTEENTH ORDINARY MEETING.

Wednesday, March 11, 1863.

The Fourteenth Ordinary Meeting of the One Hundred and Ninth Session was held on Wednesday, the 11th inst., Sir Thomas Phillips, F.G.S., Chairman of Council, in the chair.

The following candidates were proposed for election as members of the Society :—

Alcock, Thomas, M.P.	Union Club, S.W., and Kingswood Warren, Epsom.
Angel, Moses	1, King-street, Finsbury-square, E.C.
Ashton, John	10, Upper Barnsbury-st., N.
Aste, John	32, Oakley square, N.W.
Barbier, E.	9, St. Leonard's-terrace, Maida-hill, W.
Barker, George	14, Portman-square, W.
Barnard, George F.	4, Essex-court, Temple, E.C., and Cross-deep, Twickenham, S.W.
Barrass, Samuel	29, Upper Park-street, Barnsbury, N.
Barron, Frederick	8, St. Agnes-villas, Bayswater-road, W.
Bayford, Augustus F., LL.D.	52, Upper Bedford-place, W.C.
Clayton, Capt. John Wm.	14, Portman-square, W.
Hartley, T. H.	Earl-street, Horseferry-road, Westminster, S.W.
King, Charles Beeden, C.E.	20, Abingdon-street, Westminster, S.W.
Mussali, Colonel Elias	Sous Directeur au Ministère des Affaires Etrangères de S. A. le Bey de Tunis.

The following Candidates were balloted for and duly elected members of the Society :—

Atkinson, Mrs. William.	47, Gordon-square, W.C.
Dundas, George Hamilton.	13, Pall-mall, S.W.
Fowke, Thomas	11, Mornington-place, Hampstead-road, N.W.
Purdie, James	3, Walbrook-buildings, E.C.
Scott, Alexander Nairn	5, Bury-street, St. James's, S.W.

The Secretary called attention to a Mica Lamp Chimney, a notice of which will be found at page 300.

The Paper read was—

ON AN INTERNATIONAL TRANSIT ROUTE THROUGH NICARAGUA.

By Commander Bedford Pim, R.N.

The object of my paper is to bring as vividly as possible before you, the vast commercial and political importance of the connecting link joining North and South America, and the absolute necessity of opening a new route, in European interests, across it.

At the risk of being thought egotistical, I must mention my claims to be heard on the subject of transit. I may say that I know of no one who has enjoyed more advantages for studying its various bearings upon our wealth and happiness than myself. In the first place, I served during a period of no less than six years in the search for Sir John Franklin, and during that time the question of a north-west passage, that short cut to Cathay, for which we have striven so long and so earnestly, was practically solved by me, as I happened to be the first individual who actually marched from a ship coming from the eastward, the *Resolute*, to a ship coming from the westward, the *Investigator*. This incident in my life naturally gave me a taste for studying the question of "shortest routes," picked up as it were whilst looking at the world from its topmost pinnacle, the North Pole.

Secondly, after my return from the Arctic Regions, and an interval of service in China, I went with my dear friend, the late Mr. Robert Stephenson, to the Isthmus of Suez, and here again had the opportunity of going into the question of transit with perhaps the greatest engineer of the day. My observations are recorded in the Proceedings of the Royal Geographical Society.

The overland route to India, and its important bearing upon the prosperity and happiness of our country, are too well known and understood to need any further comment, but it may not be out of place to observe that, without such a certain and speedy means of access to our Indian empire, that Koh-i-nor of the English crown would have been lost to us during the late mutiny.

Curiously enough, after my return from the Old World Isthmus, I was ordered on service to Central America, the Isthmus of the New World, and I now propose to give some account of my experience in that part of the globe. On the occasion to which I refer, in 1860, I was stationed as senior naval officer on the Atlantic side, but I ought to mention that I had been previously employed in surveying the Pacific sea-board, so that I was familiar with the configuration of the entire coast.

In defining the boundaries of Central America I shall not restrict myself to the narrowest part, commonly called the Isthmus of Panama, but include the *entire* country, from the first narrowing of the land of North America, at the Isthmus of Tehuantepec, between the 16th and 18th parallel of north latitude, and 94th meridian of west longitude, and its expansion into South America at Darien, in the 7th parallel of north latitude, and 77th west meridian. In this definition I have been guided not by political divisions, but by what appear to be the strict geographical limits of the centre of the New World. Central America, then, lies between the 7th and 18th parallels of north latitude, and the 77th and 94th of west longitude; its least breadth from sea to sea is 27 miles, at lat. 9° N., long. 79° W. The extent of its coast line, counting all its sinuosities, is about 3,000 miles; its length, from end to end, about 1,350 miles; its direction N.W. and S.E.; and its area 300,000 square miles, or about the size of Great Britain and France put together.

It is hardly possible to conceive anything more widely different than the nature of the links joining together the continents of the Old and New Worlds. In the former, we have a broad, flat, low expanse of parched and arid country, rather more than 70 miles across, a complete desert; in the latter, a mountainous surface and very irregular coast line, extending over many hundreds of miles, teeming with animal and vegetable life, and only, at its narrowest part, about half the width of the Old World Isthmus. There is another striking dissimilarity—the one possessing the earliest records of the human race in readable hieroglyphics and crowded with historical associations of the deepest interest to mankind, whilst the other is a comparatively modern addition to the history of the world, with writing still an enigma to science.

Having now given a general idea of Central America, I will draw attention to those points on its surface which are especially interesting as affording facilities for transit, and I think Panama and Nicaragua are the most so. Of course there are other localities of great value and importance, but I shall confine myself in this paper to a description of the two crossings I have mentioned.

Panama claims priority of consideration, not only because it is the narrowest portion of the Isthmus, but because it is the only part of the New World which has been successfully spanned by the iron road. When the colonies threw off the yoke of Spain, about 40 years ago, every one was anxious to have a finger in the golden pie which was then laid before the world, and it is not surprising that all sorts of plans and proposals for joining the two oceans were propounded; nevertheless, nothing was really done until 1848.

In this year, three American merchants, Messrs. Stephens, Aspinwall, and Chauncey, turned their attention to the Isthmus of Panama, with a view to constructing a railway across it. The first of these gentlemen, well-known in the scientific world for his writings on Central America, devoted himself to a preliminary exploration, and proved the feasibility of the project. Having satisfied himself of this fact, he returned to his partners, and they conjointly entered into a formal contract with the government of New Granada, for the exclusive privilege of constructing a railway across the Isthmus.

The Isthmus of Panama has been successfully spanned by the iron road; the locomotive makes its daily journey from sea to sea, through the virgin forest. I have looked upon some of the greatest engineering works of the day, but I must confess that, when passing backwards and forwards on the Panama railway, standing on the engine to obtain a good view, I have been deeply struck with the evidence, apparent on every side, of the wonderful skill, endurance, and perseverance, necessary for its construction.

The contract was to continue in force for 49 years, but New Granada could take possession of the road in 20 years after completion, upon payment of five million of dollars; in 30 years, upon payment of four million; or, in 40 years, upon payment of two million. Three per cent. was to be paid to New Granada upon all dividends declared. The entire work was to be completed in eight years, and a sum of 120,000 dollars was deposited at its commencement, as security for the fulfilment of the contract, but to be refunded, with interest, on the completion of the road within the given time. All public lands lying on the line of road were to be used gratuitously by the Company, which also received a free gift of 250,000 acres of public land, to be selected from any part of the province of Panama. The two ports, one on the Atlantic and the other on the Pacific, were to be free ports, and the Company had the privilege of establishing such tolls as they might think proper.

The nature of the country through which the line of road had to be carried was such as to strike the hardiest speculator with dismay. The first thirteen miles from Navy Bay was a deep swamp, covered with jungle, reeking with malaria, and abounding with wild beasts, noxious reptiles, and venomous insects. Further on the line ran through a rugged country, over rapid rivers and all sorts of impediments, and after passing the summit, descended rapidly to the Pacific. The climate, also, was sultry, almost beyond any other part of the world, and during the wet season the rain descended in a perfect deluge. Moreover, the resources of the country were found to be *nil*, or nearly so, and consequently everything, especially labour, had to be imported; whilst, to crown all, the ports, or rather roadsteads, at either extremity, were very far from being desirable termini of the railway. Despite all these obstacles the undertaking was commenced, and, under the able superintendence of Colonel George M. Totten, successfully completed. The first blow of, perhaps, one of the boldest and grandest enterprises of modern times, was struck in 1850.

The progress made was as follows:—The first seven miles to Gatun were opened in December, 1851. Twenty-three miles were completed in 1853, and thirty miles were in full operation in 1854; while the entire road was opened for traffic on the 28th January, 1855. The total length of the road is 47 miles 3,020 feet. The total expenditure of the Panama Railway Company amounted to 7,407,553 dollars, or rather more than one-and-a-half million sterling, which is very nearly £32,000 per mile. Very few undertakings have paid better than the Panama Railway. This is not to be wondered at, when it is remembered that the company have a monopoly of transit, and charge most exorbitantly. For example, the passage money is £5 4s. 2d.; children under 12 years, half price; under 6 years, quarter price. There is only one class, so that each passenger has to pay the same. The transit occupies about four hours, the distance is 47½ miles, and the fare, therefore, 2s. 2d. per mile, the most expensive railway travelling in the world; at the same time, the working expenditure is very moderate. The fuel, for instance, is wood, and sufficient for the whole journey is procured for 2½ dollars, or 10s. The charge for freight is on the same high scale as the *passenger traffic*. Take, for example, live stock. Cattle, by steamers, trains, owner's risk, 25 dollars each, the same exactly as a passenger. Sheep, by passenger train, owner's risk, 12½ dollars each, the same as a child under 12 years of age.

The outlay for the construction of the road was, no doubt, enormous, and arose chiefly from the entire novelty of the work (it being the first real tropical railway), and the extreme paucity of labour. Men were brought to the locality in great numbers from China, India, Africa; and they flocked there from almost every part of Europe, tempted, no doubt, by the very high rate of wages, but they died within a few months after arrival, and but a small portion escaped.

Experience has proved that there is no difficulty in keeping the line in order at a reasonable expense; but, on the contrary, that it continues in better condition than similar works in northern latitudes, where the climate appears to have a more injurious effect than within the tropics.

I have alluded to the enormous cost of the line, and no doubt, working quite in the dark, as the proprietors were, they could not have carried on the undertaking but for the assistance rendered by the Congress of the United States. Messrs. Chauncey, Aspinwall, and Stephens, presented a memorial to that body praying for aid; and the State paper affording it is, perhaps, one of the most remarkable, and, at the same time, instructive documents of modern times. I must make a few extracts from it before proceeding to the second part of my subject, viz., Nicaragua:—

"It becomes the duty of Congress to consider whether the tendency and interests of our commerce, agriculture, and manufactures, the convenience of governing and defending our widely-extended territories on the shores of the Pacific, and of emigration to them, are objects of sufficient importance, when taken in connection with the proposed transport across the Isthmus, of troops, munitions of war, and the mails, to justify the government in giving such aid as may secure the completion of this great work within the time proposed—three years—and place its future management in the hands of *our* citizens. Our commerce with all the countries bordering on the Pacific Ocean is rapidly on the increase, and especially with the South American republics and Mexico, and it is believed that a more frequent and speedy communication with China and other countries of the East will produce a rich harvest.

"Great Britain is principally indebted to her skill in commerce and manufactures for her commercial ascendancy, but she is also indebted in no small degree to her position.

"The construction of the proposed railroad across the Isthmus will not only do away with this advantage over us now possessed by European commerce and navigation, but will turn the tide in our favour.

"We are so much nearer the Isthmus than the ports of Europe, and our means of communication and information will be so frequent and certain, our lines of steamers and coasting vessels so constantly on the alert, and will move with such celerity, that heavy European freighting ships will find it quite impossible to compete with them. If this view of the subject be correct, and we believe it is, the construction of this railroad will throw into *our* warehouses and shipping the entire commerce of the Pacific ocean. Our ports are on the wayside from Europe to the Isthmus of Panama, and our lines of steamers and packet-ships across the Atlantic will come laden with the freights of that channel of trade. The commerce, therefore, from Europe to the East Indies, China, and the west coast of this continent, will be forced to pursue the old route, or fall into our hands.

"Let this railroad be completed, however, and no part of the world will present as great advantages for the successful use of steam in ocean navigation as the Pacific. Coal is found on all its borders, both American and Asiatic, in the greatest quantity and perfection. Its quiet waters seem to indicate steam as the proper agent to be employed in their navigation. The spirit and genius of the American peoples, and the extent of our territory on the west side of the continent, proclaim clearly enough that we are to become the legitimate heirs of a vast commerce, that shall spread fleets of steam-ships over the bosom of this peaceful ocean.

"When we compare our present condition with what it will be when the proposed railroad shall be completed, and consider the advantages we shall then possess over all competitors for the commerce of the Pacific and the East, we need not be surprised that European capitalists have refused to lend their aid to the accomplishment of an undertaking which will not only deprive them of the decided superiority which they now possess over us in their intercourse with nine-tenths of the world, exclusive of ourselves, but will place us so far ahead in the race for commercial supremacy that they can never overtake us.

"We have already spoken of the commanding position which Great Britain occupies in the commercial world, and we deem it proper to remark still further on the advantages she has derived from it. At an early day she adopted the warehousing system. This enabled her own merchants and those of other countries to place merchandise in bond, for consumption or exportation. It has been equally beneficial to her commerce and manufactures.

"While it has exempted the merchants from paying duties on importations beyond actual consumption, it has enabled them to make up, with home manufacturers and commodities, assorted cargoes for all parts of the world. Foreigners have thus been induced to place immense amounts of merchandise in bond, that they might have the double advantage of consumption or re-exportation.

"The manufacturer has thus been enabled to allow the raw materials necessary to his pursuit to remain in store till required for use, without being burdened with the payment of large sums in duties on importations not immediately wanted. A vast supply has thus been constantly held at the expense of the foreign producer.

"Now if, by the construction of the proposed work we give such a direction to the course of trade as to bring us almost into a central position between Europe and Asia, it seems impossible to resist the conclusion that *our* warehouses must become the great depôts, and *our* cities the marts of modern commerce.

"To guard against imposition from any quarter, and secure the interests of the United States beyond contingency, the Committee have deemed it proper, in the bill submitted herewith, to provide that a *large majority* of the stock of the railroad shall be held by *American* citizens.

"The Committee recommend, therefore, that a grant of two hundred and fifty thousand dollars per annum be made to the memorialists for the purpose of enabling them to complete the work on the conditions stated in their memorial."

From the foregoing it will be apparent that our transatlantic brethren have stolen a march upon us, and successfully secured to themselves the "Gate of the Pacific;" but, nevertheless, they have not yet accomplished their great aim and object, that of monopolising the entire field. Most fortunately for this country, there happens to be another gate, which not only will afford ready access to the trade of the Pacific, but will be a highway of nations in reality, and worthy of such a title. This new route —this transit in European interests—passes through Nicaragua; but before entering upon any description of it, I ought, in the first place, to give some idea of the country through which it will take its course. In doing so I shall have to describe not only the republic itself, but a country now almost part and parcel of it. I allude to Mosquito. With reference to this latter place, I cannot do better than quote from a memorial transmitted from Jamaica to the Board of Trade and Plantations as early as 1773, but which, in every respect, holds good to this day:—

"The climate of the Mosquito shore is milder than any of the West India islands, and the air is more salubrious. The lands are everywhere well watered and fertile, the soil is rich in an uncommon degree, the necessaries and even the luxuries of life present themselves on all sides. The rivers, lagoons, and sea abound in excellent fish, and the coasts afford the greatest number of excellent turtle, both for food and the shell, of any country of equal extent in the world. The cotton-tree, cocoa, and vanilla, flourish spontaneously all over the country. Indigo, too, is a native, and seems to be the same with that of Guatemala, which is accounted the best of any. The sugar-cane here arrives at as great perfection as in any of the islands, and of mahogany and sarsaparilla the quantity imported annually is so great as to render the settlements already an object of no small importance to the commerce of Great Britain, no less than 800,000 feet of the former, and 200,000 lbs. of the latter, exclusive of 10,000 lbs. of tortoise-shell, having been shipped to England in 1769. The banks of the rivers and lagoons are equally well adapted to the growth of logwood as any part of Honduras, and we have reason to think that there is enough to supply all Europe."

I might enlarge at great length on the wonderful fertility of the Mosquito coast and its great importance to England, a value which was clearly appreciated by our ancestors, but which statesmen of the present day have failed to perceive; but I must content myself with simply remarking, that of all parts of the globe, Mosquito takes the first rank as a cotton-growing country. I make no exception, for not only is the soil and climate admirably adapted to the growth of this wonderful plant, as proved by returns issued before commerce came to a stand-still in the Antilles by the emancipation of the negroes, but its proximity to England would render competition as regards its conveyance out of the question; in point of fact, Mosquito is nearer England than New Orleans, and the navigation is incomparably less hazardous; therefore freight and insurance would be less in proportion. But it is useless to dilate any further upon the value and importance of Mosquito, for it is now virtually ceded to Nicaragua, by a treaty the most indefensible in my opinion it was possible to make. There are many glaring instances on record of short-sightedness and wrong, but few to exceed this.

The indomitable natives of this part of America were never subjected by the Spaniards, but, on the contrary, the latter paid tribute to the King of Mosquito to enable them to use the River San Juan without molestation; and, moreover, every effort to form settlements on the coast was sturdily resisted, and the attempt finally abandoned. With the English, on the contrary, the Mosquito Indians have been friendly from time immemorial. They have bravely fought as our allies against the common enemy; they have quartered their flag with ours; they have relied upon our good faith and honour, and finally have been shamefully abandoned. The Mosquito question has been a sort of nightmare to our statesmen, and at last, in an evil hour, the intimidation of the United States became more than our Foreign Secretary could bear, and Mosquito was abandoned—not alone abandoned, the protectorate was not simply given up, but the country itself declared subject to Nicaragua, a gratuitous piece of diplomacy which no one can satisfactorily account for.

But I must now speak of Nicaragua, and return to the transit route I propose to construct through that country for the purpose of practically joining the Atlantic and Pacific in European interests. Nicaragua, then, is one of the five states of Central America, possessing a most fertile territory, a healthy climate, great mineral wealth, and other resources of vast importance to commerce. Nothing but a railway through the heart of the country is wanted to develope all this.

Look at Nicaragua; her geographical position fits her for the commerce of the universe; she is, in reality, the centre of the New World. Mosquito, to say nothing of its intrinsic worth, offers an Atlantic port; an easy means of reaching this vast wealth, besides being on the highway to all our interests to the westward. But unfortunately the Government has gone out of its way to deprive the country of a vantage ground of vital importance to her commercial welfare. Such conduct, however inexcusable, is not irretrievable. At the proper period resources are brought to light under the dispensations of Providence, which have been long provided, but remain out of sight until circumstances arise which make their application self-evident. This, I am sanguine enough to believe, is the case with the discovery of the new route through Nicaragua, which only requires the requisite English energy to be shortly an accomplished fact.

It is now certain that in the new order of things the giant arms of steam must shortly embrace the whole world; whether this will be accomplished through the Americans, or by us, remains to be seen. We have stretched across the Isthmus of Suez, and with astonishing results pushed steam to the eastward; we must now do the same with regard to the Nicaraguan transit to the westward, or it is quite certain that our transatlantic kinsmen will do so, and then good-bye to Australia, New Zealand, British Columbia, and all connection with that side of the New World. We have often been warned not to trust to our rivals—possibly foes—the danger of their rivalry is best shown by figures:—

The United Kingdom of Great Britain and Ireland numbered, in 1861, 29,313,000; the United States, in 1860, numbered 27,477,090; the slaves, 3,952,801; total, 31,429,891. In the year 1871 the estimated population of Great Britain and Ireland, assuming the rate of increase to be the same as between 1851 and 1861, viz., nearly 6 per cent.—in England it was 12 per cent.—will be 30,989,000, while in the United States the population by 1870 will have attained 42,323,341; and at the same ratio, that is to say, at the rate of 34·6, the average decennial increase per cent. of our kinsmen on the other side of the Atlantic, their population will, in 1890, have reached the enormous amount of 76,677,872; in other words, be just double the number which the census returns of this country will then show. It behoves our statesmen to ponder well over these figures. There is a physical strength in this rivalry which will not allow itself to be ignored. These powerful kinsmen of ours have acquired the exclusive right of transit across Panama; and the least intelligent mind in this country must understand that our trade in the Pacific is thereby jeopardised. My earnest wish is to make this point thoroughly understood in Europe, and that has been the great motive which has induced me to write a book, "The Gate of the Pacific," about it. The monetary interests that England has in having at her command a settled and expeditious transit between home and the Pacific, and thence to British Columbia, Japan, Australia, and New Zealand, it would be impossible to exaggerate. This communication must be independent of the control of the United States, and ought to be "a great highway" in the interests of Europe; and such a route, answering in all respects to these requirements, I believe it has been my good fortune to have discovered. My proposed transit is as follows, namely, to connect the Atlantic and Pacific Oceans, by means of a railway across Central America. Starting from Gorgon Bay, on the Atlantic, lat. 11·30 N., the line would traverse the intervening land as far as the Lake Nicaragua, then skirt the shores of that lake, cross the river Tipitapa, and finally reach the Pacific at the harbour of Realejo—a total distance of 225 miles.

At the completion of the first section, namely, from the Atlantic to the Lake of Nicaragua, a temporary line might be opened for conveying the passengers and goods by steamers now on the Lake of Nicaragua across that body of water, and thence by the macadamised road which has been made to San Juan del Sur, on the Pacific. This temporary line might be opened in the interest of the shareholders in 18 months from the date of commencing the works; in less than four years the great highway itself ought to be completed. The advantages are, that the strict monopoly of the American railway at Panama would be destroyed, and thus would be restored to Europe the commerce which is now slipping away from its merchants.

England would gain considerably in rapidity of communication with Australia, New Zealand, British Columbia, &c., as much as four days to the latter, and at least ten to New Zealand. France would benefit in the same proportion by possessing a safe and speedy means of reaching Mexico from the west; in developing her interests at Tahiti and the South Seas generally, and in extending the great Transatlantic Company's lines of steamers into the Pacific, by which the maritime influence of France would be greatly increased and strengthened, and the Confederate States benefited almost as much as both the European nations put together, for no mercy will be shown them in any transaction with their late partners, the Yankees.

I suggest that an English and French Company be formed, with the view of opening this great highway of the world, and thereby checking the encroachments of the Americans.

The Emperor of the French takes a great interest in Nicaragua and the transit through that country. On the 2nd of this month, I had the honour of a personal interview with his Majesty on this subject, when he expressed himself warmly in favour of such a project, and at once interested himself in its furtherance by very effective means. I may mention that the idea of connecting the two oceans by a transit through Nicaragua was strongly advocated by the Emperor when he was in this country in 1847. He wrote a pamphlet on the subject, and besides spoke at some length at the Institution of Civil Engineers. The following are his own words and are most interesting and forcible:—

"There exists in the new world a state as admirably situated as Constantinople, and we must say, up to the present time, as uselessly occupied—we allude to the state of Nicaragua. As Constantinople is the centre of the ancient world, so is the town of Leon, or rather Massaga, the centre of the new. Like Constantinople, Massaga is situated between two extensive natural harbours, capable of giving shelter to the largest fleets, and safe from attack. The state of Nicaragua can become, better than Constantinople, the necessary route for the great commerce of the world; for it is to the United States the shortest road to China and the East Indies, and for England and the rest of Europe to New Holland, Polynesia, and the whole of the western coast of America. The state of Nicaragua is then destined to attain to an extraordinary degree of prosperity and grandeur, for that which renders its political position more advantageous than that of Constantinople is that the great maritime powers of Europe would witness with pleasure, and not with jealousy, its attainment of a station no less favourable to its industrial interests than to the commerce of the world.

"France, England, Holland, Russia, and the United States, have a great commercial interest in the establishment of a communication between the two oceans, but England has more than the other powers a political interest in the execution of this project. England will see with pleasure Central America become a flourishing and powerful state, which will establish a balance of power by erecting in Spanish America a new centre of active enterprise, powerful enough to give rise to a great feeling of nationality, and to prevent, by backing Mexico, any further encroachment from the north. England will witness with satisfaction the opening of a route which will enable her to communicate more speedily with Oregon, China, and her possessions in New Holland. She will find, in a word, that the advancement of Central America will renovate the declining commerce of Jamaica and the other

English islands in the Antilles, the progressive decay of which will be thereby stopped. It is a happy coincidence that the political and commercial prosperity of the State of Nicaragua is closely connected with the policy of that nation which has the greatest preponderance on the sea."

These words are in themselves most remarkable, but when we consider who is the writer, they assume the most important significance.

It would not be possible, in the limited time at the disposal of the meeting, to discuss this subject in even one-half of its bearings. I am however very desirous, and I think it would be more advantageous to the public generally, that time should be given to others to say something on this most important question. I shall therefore briefly sum up by remarking, that a rapid and independent transit across Central America is of scarcely less consequence to us than the one by the Isthmus of Suez; but that we have allowed our commercial rivals to shut the gate in our face, and nothing but the violent outbreak in the United States has kept our Pacific commerce from falling into their hands; again, our foreign policy in the New World is nothing to boast of, indeed it may be said with truth, that a lamentable amount of ignorance has been displayed in that quarter; nevertheless, though these errors are quite inexcusable, there is still a chance of redeeming them.

I trust very soon to revisit the scene of the proposed great International Highway, with the object of bringing the necessary details for its construction before my fellow-countrymen in a practical shape, and in fulfilling my laborious task I ask you all to wish me God speed.

DISCUSSION.

The **Chairman**, in inviting discussion upon the paper, said he believed they could hardly have a subject of more importance to consider than that which had now been brought before them, and he could not help thinking the attention of this country has been too little directed of late years to the serious fact that there was a bar across the Isthmus of Panama which obstructed the commerce of this country. It was remarkable how great had been the interest felt on this subject in former times. They all, doubtless, knew that the object with which Columbus left the ports of Old Spain was to find a free passage to India by the Western Ocean. At that time the world had no knowledge of the existence of the great Western Continent, and Columbus, when he left Spain, did not dream of discovering such a territory, but merely sought to find a clear passage to India. Two centuries after Columbus the attention of this and other countries was again directed to the subject of a passage across the isthmus; and all present were, doubtless, well acquainted with the melancholy history of the Darien Company, by whom an attempt was made to find a passage across that isthmus in the year 1695. It was unnecessary to trouble them with the history of that company; those who took sufficient interest in it would find the particulars in Dalrymple's "Memoirs of Great Britain," wherein the Scotch view of it was presented, and the English view of it was given in Macaulay's "History of England." That scheme was proposed by an extraordinary man—by no less a person than William Pattison, a Scotchman, the founder of the Bank of England. The jealousy of England towards Scotland—the union not having then taken place—the dread that Scotland should become too rich at the expense of England; jealousy on the part of Spain in respect of territory which Spain claimed, and perhaps rightly claimed, as her own; jealousy, also, on the part of Holland with reference to the possible interference with the commerce of that country, roused the able monarch then on the throne of England to take a part adverse to the Darien company, and the result was its entire ruin. They now lived in different times. They lived in times when the importance of direct communication with the Pacific was infinitely multiplied. Those great colonies at the antipodes, which were now growing up or had already arrived at a high position both as to population and commerce, rendered the object of a direct communication with this country one of growing importance. The same might be said of India, and he thought they could have no doubt that the country which possessed what Captain Pim called the gate of the Pacific, would possess an advantage which England ought to secure for herself. Captain Pim had styled the passage of the Isthmus, "The gate of the Pacific;" it was somewhat remarkable that the former promoters of the scheme designated it the "Door of the sea and the key of the universe." These were figurative terms, but they showed the importance with which the subject was regarded by men who had carefully considered it. Captain Pim had called attention to two very important considerations; one was that at the present time the communication from the Atlantic to the Pacific was in the hands of a country who, to say the least, was our rival, and would not be likely to use any power it possessed in a forbearing spirit towards this country. He had also alluded to another fact which was worthy of consideration, viz., the interest that had been taken in this question by the present Emperor of the French when in this country many years ago. He thought this fact well worthy of their attention, more especially when they looked to what that monarch was now doing in Egypt. Let them remember that he had an important scheme in progress for securing communication with India, to be used, it might be, if the canal could ever be completed, probably not to the benefit of England. Let them remember that nearly twenty years ago Prince Louis Napoleon placed before the world, when in this country, the importance of this communication; and let them also remember that at this moment there was a French army in Mexico. These were matters calling for serious consideration on the part of Englishmen.

Mr. **Cockburn Curtis** said that this subject, as Captain Pim had stated, was brought before the Institution of Civil Engineers some years ago, when Prince Louis Napoleon spoke in favour of it, and on that occasion, he (Mr. Curtis) was asked to give his opinion on the question. He would say in the first place that great anxiety was manifested on the part of the then Prince—now Emperor—to secure generally to the world the benefit of this very important communication between the two great oceans. The mode in which he proposed to effect it was by means of a navigable canal. They did not at that period consider railroads so available as they did at the present day, but it had since been found that railways could be made much cheaper than canals, and that even lines in such exceptional districts as the one under consideration might be made to return a good dividend to the shareholders. Some of the railways in England had been constructed at a cost of as much as £70,000 per mile, and the average of all the lines was between £36,000 and £40,000 per mile, as against £4,000 to £5,000 at which railways had been constructed in Spain; and he apprehended in a new country like that now spoken of, where a large portion of the land would be granted, and other facilities given to the persons interested, a railway might probably be made at considerable less cost even than that. On a former occasion he had spoken of the difficulties of entering the ports on the Pacific side, owing to the heavy storms on those shores, rendering it difficult for any sailing vessel—even for a well appointed man-of-war—to bear against such gales. This was in 1847, but since then great advances had been made in steam navigation, and having crossed the Atlantic in some of the splendid ships now running, he ventured to say these difficulties could now easily be surmounted. It was a question of artificial power against the power of nature, and a steam vessel, instead of having to get in-shore, where she was exposed to the heavy gales coming off shore, could select her own route. As far as his own knowledge of the district generally went, he thought the provisional route proposed by Captain Pim was a very available one, partly by railway, partly by navigation, and partly by road, and it had the advantage of opening up the communication in the shortest time. The permanent route was to be entirely by railroad from Gorgon Bay to Realejo. The latter possessed the advantages of access to an excellent port, whilst they found that the port of Greytown was rapidly filling up From surveys he had seen of Gorgon Bay, he considered it far more available than Greytown. He thought that the route now pointed out was decidedly deserving of careful examination, and he most heartily wished Captain Pim God speed in his undertaking.

Mr. **Charles White** (Consul-General for Nicaragua), responding to the call of the Chairman, said as his friend Captain Pim was about to engage in this investigation, he could not do less than wish him a successful voyage. Two years ago, he had the pleasure of travelling through Nicaragua, and he was connected by business and friendship with many of the inhabitants of that country. He had traversed the Isthmus of Panama in three different places, and having travelled upon the Panama railway, he could confirm what Captain Pim had stated, that it was one of the most extraordinary works he had ever seen. He could not say how many thousand people fell victims to the opening of that communication. It was a most unhealthy climate to Europeans, and was not inappropriately called the Englishman's grave. His trip through the isthmus was a most rapid one. He had bathed in the morning in the waters of the Pacific, and in the afternoon of the same day in those of the Atlantic. Having described a journey from Greytown up the San Juan river, and pointed out the obstacles to the passage caused by the numerous rapids, and having referred to the difficulties of navigation from the filling up of the harbour of Greytown, Mr. White proceeded to express his opinion very strongly in favour of Captain Pim's proposed line of railway from Realejo to Gorgon Bay, in which he believed there were no engineering difficulties to be encountered. After the proposed railway had reached San Miguelito, Captain Pim proposed that it should pass through some of the richest provinces of the country, in which there were valuable gold mines, and immense tracts of prairies for cattle. Hides which were formerly sent to America were now sent in large quantities to this country. Mr. White also mentioned that in 1859 he received seventeen tons of ore from that district, which contained gold and silver in about equal proportions, and he sold that amount of ore for a gross sum of £1,200. On making inquiries relative to further supplies of the same description of ore, he found that the mine had been destroyed by the natives having knocked down the supporting pillars during the absence of the owner in Europe. He could state from his own personal knowledge, that Senor Martinez, who had been recently re-elected President of the republic of Nicaragua, had viewed Captain Pim's project with great favour, and was disposed to give every facility in his power towards carrying it out. In conclusion, he stated that there were no difficulties in Nicaragua to be compared with those of the Panama Railway. It was a comparatively flat country, and travelling through it by railway would be a very pleasant journey. He regretted that circumstances would not allow him to accompany Captain Pim in the voyage of exploration he was about to undertake, but he heartily wished that a successful result might reward that gentleman's enterprise.

The Rev. P. **La Trobe** had some knowledge of this country and people, through his connection as secretary with the only society that had established missionary stations on that coast, and his attention was directed to it many years ago by a somewhat singular circumstance. A German prince of great wealth and public spirit entertained the idea of colonising that portion of Central America, and applied to him for such information and aid as he was able to give. He (Mr. La Trobe) communicated with Sir George Grey, then Under Secretary for the Colonies, and also with the agent at Honduras, and the result of the inquiries at that time was such that the philanthropic prince was strongly recommended not to throw away his money upon the project he had entertained. In 1840, however, the first missionary station was established there, and since that time four other stations had been added, and there were between five hundred and six hundred of the natives connected with those stations. From all the accounts he had received, it appeared that the climate was very favourable to European constitutions, much more so than any of the West India Islands. They had not lost a missionary during the last fourteen years from pestilential fever. Although only a small portion of the country, reclaimed from the primeval forests along the coast, had as yet been cultivated, abundant evidences were afforded of the richness and value of its native productions, particularly cocoa, the quality of which was not surpassed in any part of the world, and there was great reason to believe that by education and civilisation, the people would be raised in the scale of being. They had looked with some jealousy upon the encroachment of the Nicaraguan republic upon the Musquito country. The king of the latter was not a very enlightened man, and was addicted to the vice which too often followed the advent of European settlers—intoxication. He had no doubt that a colony of well-conducted Europeans would be able to effect great things in the cultivation of a country so rich in all its products as the one under discussion. In reply to an inquiry from the chairman, Mr. La Trobe stated that the missionaries were all Europeans, and mostly Germans, some of whom had lived in the West Indies, and spoke more favourably of the climate of this part of Central America than of that of the West India Islands.

Dr. **Berthold Seemann** said his acquaintance with the country under consideration did not extend much beyond the coast. He accompanied Captain Pim in his survey in H.M.S. *Herald*, and he could confirm the statement of that gentleman with respect to the harbours mentioned being admirably suited to the purposes intended. He looked upon this project with great hope. It was one of vast importance to British Columbia, Vancouver's Island, and the whole of the eastern coast of Australia, and he believed it would be most valuable in a commercial point of view. The only question was as to the nature of the 60 or 70 miles which Captain Pim had undertaken to explore, but from all the information he had obtained from the Indians, he had no doubt it was a comparatively flat country, without any high mountains that would be an obstruction to a railway. He had no doubt whatever either as to the practicability or the ultimate success of the undertaking. As far as the natural products of the country were concerned, he had seen the finest samples of sarsaparilla and cocoa, which would rank with those productions in any other part of the world. He could bear testimony to the favourable character of the climate for the production of cotton for a vast extent of land along the coast, from whence they might look for a quality equal to the best Sea Island of America; and the fact that it was nearer to England than New Orleans, was one deserving of particular notice.

Mr. **Charles White** said he had omitted to mention one very important production of the country, viz., india-rubber, of which there was an immense supply. He had received from Greytown extensive consignments of that material which now so largely entered into the manufactures of this country. He believed Captain Pim might repay the expenses of his exploration by employing the natives to tap the trees for india-rubber; and if that operation were properly performed, they would yield a continuous supply for many years.

Mr. **Parke Pittar**, although he had no personal acquaintance with the country in question, wished to offer one or two observations on this subject without reference to the locality itself. He had read Captain Pim's work with an interest amounting almost to enthusiasm, and every one must agree that the subject could not have been treated in a more masterly manner. He (Mr. Pittar) addressed them both as a merchant and as a traveller. The tone of feeling that evening had been all one way; he therefore rose for the purpose of introducing a little pleasant opposition, and he knew Captain Pim would be *rejoiced to* answer any suggestions that might be offered. He objected *in toto* to a railway across the isthmus in question; he thought a canal would be preferable in many points of view. There was at the present time one railway across the Isthmus of Panama upon which, however, the question was raised that it was entirely in the hands of America. Having himself crossed the Isthmus of Suez eleven times, he was practically acquainted with the inconveniences of unshipping and re-shipping merchandise, by which there was not only great delay, but damage to many articles by breakage. With regard to passengers, it was a great nuisance to leave one ship, then to cross the desert, and embark in another ship on the other side of the isthmus. With a canal there would be no necessity for transhipment either of passengers or cargo, and he thought such a means of transit would command the great bulk of passengers and merchandise. In England they knew that a railway with two or three breaks stood no chance with a direct line. Therefore, he thought if Captain Pim in his survey could find out a route through which a canal could be carried, it would be preferable to the railway he had suggested. He threw out the hint as one which in his opinion was worthy of consideration.

Mr. **WM. HAWES** believed that all the discussion that had taken place on this subject confirmed the opinion that cutting a canal of sufficient capacity for the large ships engaged in the colonial trade was quite impracticable, whether considered with reference to the time required to do it or its cost. His objection to this paper, however, was based upon entirely different grounds. It was true they had an overland communication with India, but that was confined to passengers of the highest class, and to freights of large value and small bulk. The travellers by that route were those to whom time was of more consideration than money; but as between this country and Australia, they would find that but few passengers, and but a small quantity of goods, could incur so extravagant a cost of transit. Independently of that, they had no facts to guide them upon the question whether this route would or would not be an improvement upon the present one. They were aware that large companies had been formed, having extensive interests, which had taken the best means of ascertaining the advantages and disadvantages of having communication with our Australian colonies direct by Panama, or by some other passage across the Isthmus, in preference to the sea-passage by the Cape of Good Hope or Cape Horn. The results of all the investigations that had been made had been laid before parliament and the public in various reports, and it was shown that although in the outward journey they gained some advantage, yet it was lost on the return route. They might reach Australia within a given time, but the question was whether they could accomplish the return voyage with the same advantage. Taking the average outward and homeward voyage, there appeared to be only a few days' difference, even under the most favourable circumstances, by the Isthmus route as compared with that round Cape Horn. For Sydney, by the American route, the average time was 111 days; by the European route, 118 days 6 hours; by the overland English route, 112 days; and by the sea route, 118 days: so that the gain in time amounted to very little by the Panama route. What were the other difficulties? They were told of the salubrity of the climate and the abundant produce of the country; but what had the passengers passing through this little bit of country to do with that? Those who knew the country generally had stated that it was not suited to European constitutions, and that the difficulties attendant upon leaving a vessel, passing over the isthmus by another means of conveyance, and waiting for another vessel on the other side of the isthmus, were such as to deter anybody from going by that route. He had had no personal experience of either route, but he thought no one would take this direct route with the risks, dangers, and difficulties of being transhipped, with the chances as to the due arrival of the ship on the other side of the isthmus to continue the journey, and with anything but good accommodation during the detentions. No one would risk all these difficulties for the sake of saving a few hours in a voyage like that. Then they were told that one great advantage of the proposed route was the remarkable cheapness of construction of the railway, and figures had been quoted to show that, as compared with England, the expense of this railway would be very trifling indeed. It was a pity in a discussion like this, to make exaggerated statements. They had been told that the railways in this country cost something like £70,000 per mile. Every one knew that was a great exaggeration.

Mr. **CURTIS** mentioned that as the cost of one railway.

Mr. **HAWES**—One might have cost £100,000 per mile, but who would dream of quoting that as an instance of the cost of railways generally? The aggregate cost of the railways, in round numbers, had been about 330 millions, and the number of miles being about 10,000, made £33,000 per mile the average cost of the whole railway construction. There had been quoted to them this evening the opinions of certainly one of the greatest men of the day, the Emperor Napoleon. His views on many subjects were very valuable, but it was a question whether his opinions, now that he was emperor, were similar to those which he stated in the discussion which took place before the Institution of Civil Engineers many years ago. He did not think the Emperor would repeat the statements now which he made on that occasion. But supposing he would do so, what did that amount to? It amounted to this—that if the statements made of the facilities of this proposed route were true—if that was the great natural highway from Europe to Australia, let them make it as perfect as they could, so as to be available to every European country. But they had yet to prove this; they had yet to prove the practicability of the route, an economy in time and the greater facilities for the transport of merchandise; they had yet to prove the whole case. But beyond all, as an inducement to take up this project, they were told that the Government had greatly neglected our natural interests, and had grossly misused this state of Mosquito. It was at one time a national question that we should have influence and interest in that tract of country as opposed to the Spaniards, who held the whole of South America. We then held the Mosquito territory as a barrier against the further aggressions of Spain, but as time went on, Spain lost her influence in that quarter, and England had no longer the same interest in its occupation, and gave up a country which we had no claim to, and which had been an enormous expense to us without any adequate return being derived from it. Therefore, to say that the Government, in their foreign policy, were neglectful of our interests in yielding up a country to its legitimate owners and occupiers was, he thought, an imperfect view of the question.

Captain **PIM** said he had not complained that the country was given up to the rightful occupiers and owners; but that it should be given up to a Roman Catholic country, which was a most iniquitous proceeding.

Mr. **HAWES** would not raise any religious debate upon this question; that had nothing to do with the subject under discussion. He thought neither the paper nor the remarks of those who had spoken upon it had established the facts laid down; they had failed to show that there would be any adequate saving of time or money, or any increased facilities upon which the success and value of the plan must depend.

Mr. J. H. MURCHISON said the importance of the question brought before them this evening could not be overrated, whether they regarded it in a political or commercial point of view. Indeed, in a country like England, based as its high position was upon the unlimited extent and great value of its trading operations in all parts of the globe, it was impossible to enter into a discussion involving our great commercial interests without also considering questions of great public policy. They had been told by the gentleman who last addressed them that the position laid down this evening had not been established. Perhaps he had not heard of the speech of the Colonial Secretary, the Duke of Newcastle, last session, when he informed the House of Lords, and, through the House of Lords, the people of this country, that he had been unable to communicate with the governor of British Columbia for six weeks, for fear of the dispatches falling into the hands of the Americans, in case of war breaking out between this country and the United States. He thought if no other fact were named to substantiate the views of Captain Pim it was this—England ought not to be in a position that she could not communicate with her own dependencies except at the mercy of a country who might choose to go to war with her. Mr. Hawes had told them that this route was unnecessary. Was that the opinion of the colonies themselves? They had in this country, at the present moment, only recently arrived, a member of the government of New Zealand, with powers to offer to any company prepared to carry out a route by the isthmus, a subsidy of £30,000 per annum, and that from their youngest colony—New Zealand. There was also in this country an agent from the colony of New South Wales, prepared to give a subsidy of £50,000 per annum to any company carrying out this route. There was no doubt that political considerations of the highest importance to this country were involved in this question, and if Mr. Hawes did not think the colonists required it, they themselves, who might be presumed to be the best judges of their own interests, were prepared to sacrifice a considerable annual subsidy to effect this object. Mr. Hawes had told them also that the voyage round Cape Horn occupied only 118 days. He (Mr. Murchison) believed 160 days was more like the time. But the great question involved here was this:—There was now a railway across the isthmus; was that sufficient? Even putting out of consideration all political considerations—even putting out of the question that we were in the hands of the Americans in case of dispute with them—he would ask, Did the Panama Railway meet all our requirements? Although it was only 47½ miles long it took four hours and a half to cross the isthmus, and the fares were most exorbitant, as stated by Captain Pim. He believed, moreover, the Panama Railway went through a district containing no towns, but only hamlets with a very small population; that the ports at each end of the railway were most incommodious and unsafe. He believed that passengers had to embark and disembark at the risk of their lives. But there was one point which affected Englishmen more than any other—that was, that unless a passenger had a direct through-ticket from New York, he was detained ten or twelve days in Panama, while the American people were not subjected to that inconvenience. He met a gentleman recently returned from British Columbia, who told him he was detained twelve days in Panama. He would therefore ask whether the inconveniences which existed as to the Panama railway — irrespective of political considerations—did not show the necessity of looking about for some other means of getting across the isthmus of Central America? They had now to look to the route proposed by Captain Pim. It was a longer line of railway, but he believed it would not take a longer time to cross, and there was every promise that it would be a remunerative undertaking. But what was more important, the ports of Gorgon Bay and Realejo were of the best and most commodious description. Passengers could land direct from the steamers and enter the train, and the same facilities existed for re-embarkation on the other side of the isthmus. But another point was the question of climate. They had heard from the reverend gentleman who had addressed them from his own personal experience, that the climate was not objectionable. Then as to the question of population; whilst that through which the Panama Railway ran was very small indeed, he believed the population through which the proposed line would pass, was nearly three millions. He would ask whether these facts were not of great importance in considering the necessity, commercially, of establishing such a route, independent of all special interests, free and open to the whole world? Mr. Hawes had moreover told them that they should attach but little importance to the opinions which the Emperor of France had expressed on this subject, that the Emperor was a different man now to what he was when he uttered those sentiments in this country. However much he (Mr. Murchison) might differ from the Emperor on political matters, he did not think there were any just grounds for making such a statement. Moreover, Captain Pim had told them that he had lately had an interview with his Majesty, and so far from having altered his opinion, he entered warmly into the project, and promised to give it his best support. One gentleman had advocated the construction of a canal instead of a railroad. The ancient Egyptians endeavoured to carry a canal between the Red Sea and the Mediterranean. There was a great doubt whether it was ever made. but even if it was, the best authorities informed them that it took a century to construct, and he believed that it was difficult now to find a trace of it. They were also told that the Greeks and Romans contemplated a canal across the Isthmus of Corinth; but it was a mere intention, for the difficulties were so great that it was never carried out. But while they were told of so many intentions to open canals, they had the great fact before them that there *was* a railway communication between the two great seas across Panama; and, notwithstanding the great difficulties that railway had to contend with they found it was paying large dividends to its proprietors. The last dividend was 16 per cent.; the next was expected to be 20 per cent.; consequently, whatever might have been the difficulties and the cost of that line, it paid the shareholders very handsomely. But another objection to canals was this—that whilst they could open a railway in sections, as it was completed, they could not open a canal till the last foot of earth was excavated. It would probably take ten years to construct a canal, and the estimate of the cost varied from six millions up to 30 millions. It was not likely, therefore, that a project for a canal would meet with support from capitalists. There appeared to be some misunderstanding in the meeting as to the average cost of the railways of this country. He believed it would be found to be about £32,000 per mile. Captain Pim, at the commencement of his paper, modestly alluded to the distinguished services he had rendered in the high profession to which he belonged, and with which services those who took an interest in the events of the country must be familiar. He believed Captain Pim was yet destined to confer still greater benefits on this country; and he was quite sure anyone who had read the work he had lately published would be convinced of this—that any undertaking he lent himself to, and any great enterprise he took in hand, would be carried out with indomitable perseverance and undaunted courage. He believed, although the services which Captain Pim had already rendered to the country would hand down his name with fame to posterity, the services he would yet perform would show him to be one of the greatest benefactors of his kind. He thought the words of the poet (Moore) were not inapplicable to the subject before them, and perhaps not inapplicable to the fame which he believed would be awarded to the name of Bedford Pim:—

Who that surveys this span of earth we press,
This speck of life in time's great wilderness,
This narrow isthmus 'twixt two boundless seas,
The past, the future, two eternities!—
Would sully the bright spot or leave it bare,
When he might build him a proud temple there,
A name, that long shall hallow all its space,
And be each purer soul's high resting-place!

The CHAIRMAN, in proposing a vote of thanks to Capt. Pim for his paper, remarked that he was sure his friend Mr. Hawes would agree that, although he questioned some of the arguments of the paper, the subject they had discussed was a very important one. He still thought, after all that had been said, its importance could hardly be overrated. Whether the difficulties could be surmounted was another question; he had great confidence that they could, and that the scheme when carried out would be highly beneficial. It was one of the advantages of these meetings that they brought out the adverse opinions upon all the questions that came before them. It was desirable never to close their proceedings with merely hearing one side of the question. It was desirable that the subjects should be fairly criticised, not in a hostile spirit, but in a critical temper—that all the difficulties and objections should be pointed out, and, as far as possible, grappled with. That seemed to have been done in the present instance, and he would now bring the proceedings to a close by asking the meeting to return its thanks to Captain Pim for his very interesting and able paper. Whatever might eventually become of the great question, they would all feel that Captain Pim had not been uselessly engaged in bringing before his countrymen the benefits which he believed would result from the execution of this work.

The vote of thanks having been passed,

Captain PIM, in acknowledging the compliment, remarked that the observations of Mr. Hawes, by whom the only objections to his scheme had been raised, had had been so fully and so ably replied to by Mr. Murchison that nothing had been left for him to add. His motto was "Deeds, not words." In bringing this subject before the attention of the public he anticipated much opposition and the having many objections to meet. Lieut. Waghorn surmounted enormous difficulties, before he introduced the great blessing to the Anglo-Saxon race of the overland route to India; and he could not expect but that he (Capt. Pim) would have many difficulties to encounter. He was becoming almost desponding when no one got up to speak against his scheme, from a fear that there was nothing in it, but after the remarks of Mr. Hawes he took heart, especially as they had elicited the reply of Mr. Murchison, which he (Capt. Pim) thought had completely demolished Mr. Hawes's objections.

The Secretary announced that on Wednesday evening next, the 18th March, a paper by Mr. Charles B. King, "On the Suppression and Extinction of Fires," would be read. On this evening the Earl of Caithness will preside.

MICA LAMP CHIMNIES.

M. del Campo, a corresponding member of the Society in Holland, states that an application of mica to lamp chimnies has attracted his attention on the Continent. The advantages of these chimnies are that they neither crack from a sudden change of temperature, nor break from falling down, which is an important thing in large buildings like manufactories, churches, &c. These chimnies have come into general use on the Continent, but as he has not met with them in this country, he has sent one of them to the Society, in order that those members who take an interest in the matter may make themselves acquainted with it.

Home Correspondence.

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THE PATENT LAWS.

SIR,—It cannot be disputed that the patent laws are most unsatisfactory, and require a thorough revision. At present the opponents to the granting of patents point with much force to the great proportion of patents being of a most frivolous character, and therefore advise their entire abolition. Such a measure would not only be unjust to the true original inventor, but would foster a system of secrecy and misrepresentation.

It must be admitted that the publication of specifications lends material aid to the inventor in informing him of the progress made in any particular department.

The idea of refusing a patent on the ground of its being a monopoly is inconsistent with the truth. Certainly that which had no previous existence cannot deprive any one of any right already possessed. In English law a monopoly is defined to be "an allowance of the Crown, by grant, commission, or otherwise to any person or persons for the sole buying, selling, making, working or using of any thing, by which other persons are restrained of any freedom or liberty that they had before, or hindered in their lawful trade." No original invention can possibly be deemed a monopoly. It is, in fine calling into existence some effect, by the aid of chemistry or mechanism, or their combination, which was not previously known. No patent should be granted except it came strictly under that category.

The accidental discovery of a diamond or a nugget of gold gives the finder an actual property. Anyone who had gone over the same ground might have found the diamond or the gold. The inventor, however, requires to be fitted, by a knowledge of his subject, obtained by education or experience, before he can successfully remedy defects, or meet public requirements. No one is forced to use an invention; nor, as a rule, is it used except it offers some positive advantage over the method previously known. It is, therefore, not sufficient to merely invent, but the invention must be made of public utility. He whose education and talents enable him to devote his time to benefit others, surely cannot be denied compensation for so doing. If that were to be admitted, no profession, art, or calling would be exempt. Mental property should, of all others, be amply protected. If not, where is the inducement to improve? There no doubt will be exceptional cases where men of talent can afford to give their services to the world without compensation. These cases must necessarily be the exception to the rule. It would be quite as consistent to make the medical man, the clergyman, or the lawyer, give their intellectual acquirements without reward, as the inventor. Free trade in mind is an abstract idea—a mere myth; in fine, it is incompatible with our intellectual capacities. Intellectually, men are not equal.

Free trade in thought—if such were practicable—would destroy that ambition and zeal which prompts the man of superior genius and mental capacity to devote himself to the task of surpassing all previous efforts. Imagine the work of a sculptor or painter—produced after years of toil—which for its excellence commanded universal admiration, being copied by any one, and sold for the mere price of the mechanical imitation!

Invention, which improves and cheapens the production of things essential to the wants and requirements of civilized society, should be rewarded. Otherwise, why should there be protection to any description of property?

It is the intellectual operations of the mind in one channel or another which alone has established the grades of society. Destroy all species of protection, and adopt the ultra-democratic idea—that free trade should be carried to these extreme limits—why then should one have protection for any species of property? On this principle the pickpocket takes your watch because he has not one of his own. Those who were lately convicted of making Bank of England notes, no doubt thought themselves free tradesmen in this sense. It is a singular fact, that the most noisy opponents to patents are those who are desirous of, but are now prevented from, appropriating to themselves the patent inventions of others. Why do not these invent some method of arriving at the same results? If not, why should they object to pay for that which they of their own free will use, when it is not imperative that they should do so? Surely, that which is worth having is worth paying for. That the user is benefited by the adoption of any particular invention is self-evident, or why does he use it? In all our relations of life from the most trivial to the most important, do we not pay for benefits received?

The abuse to which the present system of granting patents is carried, may be illustrated by a case which recently came under my notice:—A person with whom I was in conversation on the subject of steel shirt collars, he wearing one, complained how stiff and inconvenient it was, though in other respects answering the purpose, when I jocosely said, "Why do you not get some of Dr. Cattell's refined gutta percha, or add magnesia to a preparation of gutta percha; it would make a capital collar?" This person, without ever informing me of his intention, goes to a manager of a patent agency company, states *his* discovery, pays £9, and the provisional specification actually includes not only Dr. Cattell's preparation, but the addition of magnesia! Had I said arsenic, calomel, or cream cheese, I verily believe it would have formed part of the specification. It is the monstrous multiplication of such cases which has brought patents into disfavour, ridicule, and contempt, with those who summarily class all under the same denomination. That such a system demands a thorough reform no rational person will question.

How is this to be accomplished?

The only method to meet such cases is to have a competent board of examiners, before whom the applicant should submit his claim for a patent. If found to be an original idea, or combination of ideas, the protection asked should be granted. If not, it should be refused—the reasons for such refusal being fully stated—so that the applicant could have the opportunity of amending his former claim, and if, when amended, it should be found to demand the granting of a patent, this should be allowed accordingly. It is desired by some, that if refused, the applicant should have the option of taking out a patent independently of the adverse decision arrived at by the examiners. Such a course would be like a medical student being able to obtain his diploma independently of the examiners, after they had found him incompetent to receive it. The more rigid and searching the investigation prior to the granting of letters patent, the more valuable the patent when granted.

To point out the benefits which the public derive from inventions would be to recapitulate the introduction into this country of gas, steamships, the locomotive, electric telegraphs, improvements in nearly every department of industry, by which the few millions of England's population are enabled to supply the world; without which the production of all her operatives would not be sufficient for her own demands. In fine, invention has rendered this empire the greatest and wealthiest of the nations. Who then will, with honesty, deny to the true original inventor the only recompense—a limited protection—for his labour and time in the accomplishment of such mighty national benefits.

The whole system attendant on the obtaining of a patent, as at present practised, is a fraud and a deception on the poor inventor. There are those who make a regular business of speculating on his necessities. Many of the most valuable inventions are lost to the owner from his incapacity to meet the present enormous Government fees. There are but very few patent agents or attorneys adequate to the responsible duty they have assumed. The consequence is, that when the specification is brought before a legal tribunal, it is found defective, and very often not in accordance with the ideas or intentions of the inventor. These and many more defects, consequent on the present state of the law, would be effectually remedied if a preliminary tribunal were to be instituted; no application to pass or receive a patent which did not fulfil all the conditions essential as constituting an original and true invention—not a mere application of another's idea, or the application of an existing method or mechanical arrangement to another purpose, or coloured alteration, made in ambiguous terms, so as to mislead and confuse. Such, unfortunately, constitute too great a proportion of the patents now granted. In a word, let us have a good, strong, substantial patent, or none at all. I am, &c.,

ROBT. H. COLLYER, M.D., F.C.S., &c.

Beta House, Alpha-road, N.W., Feb. 21, 1863.

Sir,—Having had many opportunities of observing the perplexities and annoyances to which patentees are exposed, I take the liberty, with your kind permission, of pointing out some of the defects of the system, with a view to their removal, so that the meritorious inventor may be effectually protected from the machinations of unprincipled imitators.

The process of obtaining a patent is so costly as to preclude the possibility of a poor man securing the benefit of his invention, however important it may be to the public, for he must either abandon the project or sell the secret for a trifle to a speculator. Such circumstances have a depressing influence on the growing genius of the age, and press hardly on the poor skilful mechanic.

When a patent is obtained for a thing in general use, the inventor is surrounded by a host of imitators, who, under colour of some trivial alteration in the means, arrive at the same result. Others, more daring, copy still more closely, under the plea of the idea not being new; thus the patentee has, single-handed, to encounter a crowd of tricky assailants, who attack him at all points, till at last he is obliged to seek refuge in a court of law; and when he has done so he finds that he has jumped out of the frying-pan into the fire, and all to defend a right granted by no less a power than the Crown itself. To obviate all this I venture to propose:—That the cost of letters patent be reduced to a scale approximating to the charges for the registration of articles of utility; that, on applying for a patent, the inventor set forth all particulars in a specification, and if the applicant's claim to originality be established to the satisfaction of the experts attached to the Patent Office, public announcement be made by advertisement that such patent has been applied for; and that if the right to such patent be not disputed or challenged within one, two, or three months the same shall be granted, and that after that time no objection shall be admissible, nor shall proof of the existence of an idea tending to the same or to a similar end, vitiate the patent. It is the duty of the authorities of the Patent Office to satisfy themselves as to the originality of the invention for which protection is sought—for many may really believe they are the inventors of something that may have been known for years—and, on the other hand, it is equally their duty to protect the rights of those whose claims are recognised, or should be, by the letters patent themselves. In short what is wanted is, that the patent commissioners should be responsible both for granting patents and protecting them. At present the Patent Office is like a doctor who pockets the fee without benefiting the patient. All persons infringing patent rights should be amenable to a summary process, as under the Registration Acts.

There may be some points open to amendment and many details to supply. The above is but the rough outline of a plan calculated, in my humble opinion, to remove many of the obstacles which, at the present time, impede the progress of invention. I am, &c.,

GEORGE ELLIS.

Feb. 1863.

THE COTTON QUESTION.

Sir,—At the Society's meeting on the 25th February, Mr. H. Ashworth, when speaking of Indian cotton having been produced on the plantations for three farthings per pound, threw discredit on the truth of the facts, and asked, what vegetable material was there, with the exception of straw, that could be produced for this price. I, in answer, beg to observe that there is a vegetable product and a cotton capable of being produced at less than three farthings per pound, that is to say, £5 per ton, and the name *of this* article is the Bulbous cotton of South Africa. For further particulars as to the quality, I beg to refer to a communication on the subject by the well-known scientific chemist, Mr. Keates, of Chatham-place, which appeared in the *Journal* at page 48 of the present volume.

I am, &c.,
THOMAS G. GHISLIN.

72, Hatton-garden, March 4th, 1863.

Proceedings of Institutions.

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Dudley Mechanics' Institution.—The fifteenth annual meeting of the members of this Institute took place on Friday evening, the 30th January. In the absence of the President (Mr. F. Smith), the chair was occupied by Mr. John Finch. The report was read by Mr. Joseph Stokes, honorary secretary. It stated that in no one department had there been any retrogression, but, on the contrary, steady progress had characterised the past year. The number of members had considerably increased. Last year the list contained 200, this year the members were 240, showing an increase of 40. The report concluded with the following reference to the institute now in course of erection:—"The 'new building' phantom has been annually raised, exorcised, and raised again, until it seemed as if we were all becoming quite contented with a ghost and nothing more. Happily, however, during the past year, this spirit has entirely vanished, and in the place of the visionary edifice with which you have each succeeding year been made more familiar, the committee rejoice to think that they can now present you with something more real and substantial as the result of their efforts to provide a suitable home for the institution. At the last annual meeting the members were informed that a very advantageous site had been purchased in Wolverhampton-street, plans prepared, the probable cost ascertained, and all that was needed to justify the committee in at once proceeding to build was the prospect of obtaining funds sufficient for the necessary outlay. A great part of the succeeding year passed away, and yet the pleasing prospect of obtaining £4,000 (the estimated cost) did not appear in view. The committee being most anxious not to have to meet the members again without having done something, then considered whether it was possible to build only a portion of the contemplated structure. Finding that this could be done, they at once made arrangements for the commencement of so much of the building as would supply the more pressing wants of the institution. Tenders were invited, and that of Mr. Millward for £2,285 was accepted. Since then the committee have received from the Earl of Dudley an offer to subscribe £500, providing the whole design, including the large hall, be completed. Under these circumstances the committee, although they feel they are incurring a very heavy additional responsibility, have felt bound to take steps for the completion of the whole building as soon as possible; and now the committee point with pride to that auspicious day, so anxiously looked forward to by all the friends of this Institution, when the chief stone was laid of that building which has so long existed in our imaginations, but which is now rearing its grand proportions, and the noble appearance of which already begins to ornament the town. A very large sum of money will be necessary to complete the undertaking. At present little has been done in the way of collecting subscriptions; this, however, must now be commenced at once, as the building has so rapidly progressed that the funds at the disposal of the committee have already been exhausted. The committee, therefore, in concluding this report, earnestly hope that the call which will now be made upon the members and the inhabitants of the town will be most cheerfully responded to. The report was adopted amid acclamation. The balance sheet which was presented showed that the total amount received from all sources was £217 12s. 8d., while the expenditure had been £211 3s. 4d., leaving a balance in the treasurer's hands of £6 9s. 4d. After adopting the balance sheet, the meeting proceeded to pass the usual votes of thanks. Mr. Jones (organising agent and secretary of the South Staffordshire Union of Institutions), in alluding to the night school, intimated that it was highly creditable to the Institution, and observed that there were only two other Institutes with which he was connected that had engaged in so excellent a work. He urged the committee to persevere in this movement, and expressed confidence that it would be developed to a very great extent in those large rooms which were rearing their heads so auspiciously in Wolverhampton-street. Mr. Jones, at a subsequent part of the evening, entered into an elaborate explanation of the advantages to be derived from the union of the Institute with the Society of Arts, and strongly advocated the desirability of this Institute competing with others in the neighbourhood for the prizes and certificates of that Society. Towards the close of the meeting, Mr. Stokes informed the members present that one of the intended designs fer raising necessary funds was the holding of a bazaar on a grand scale at the opening of the new Institute. A vote of thanks having been passed to the chairman, the meeting separated.

Salisbury Literary and Scientific Institution.—The last report states that the number of members has increased to 274, and in consequence the reading-room has been used to a much greater extent than during any previous year. It is supplied with seven daily and thirteen weekly newspapers, and with the leading periodicals. In their last report the Committee alluded to the desirability of enlarging the library. Their warmest thanks are due for the liberality of the members and friends of the Institution which has enabled them to carry out this important object. By means of a special fund £50 worth of new books, most carefully selected, have been placed on the shelves, so that more than 1,500 volumes are now in circulation. A new catalogue has been published, and a more efficient organisation introduced, rendering the library one of the most attractive and useful branches of the Institution. The following is a list of the lectures delivered during the past year:—Henry Fawcett, Esq., on "Coral Insects;" Rev. G. G. P. Glossop, on "Photography;" Mr. T. E. Spinney, on "Music," with vocal and instrumental illustrations; Rev. R. Fitzgerald, on "Colour in Nature and Art;" The Very Rev. The Dean of Chichester, on "The Beginnings of Literature and Science;" J. A. Roebuck, Esq., on "Popular Education;" Rev. James Fraser, on "Addison;" Rev. M. F. Sadler, on "Hugh Latimer." A concert was given by Mr. T. E. Spinney, assisted by the cathedral choir, and the annual concert in aid of the funds was conducted by Mr. Kenningham. The Committee present their best thanks to the foregoing gentlemen, who have in every instance given their services gratuitously. In conjunction with the Committee of the South Wilts Museum, a conversazione was arranged, and owing to the *kind* way in which all who had it in their power to contribute to its success gave their assistance, the result was in the highest degree satisfactory. A large and valuable loan collection was exhibited in the Council Chamber, and both on the evening of the conversazione, and on several succeeding evenings, short addresses were delivered in explanation of the purposes of the meeting, and of the various objects of interest in the room. The finances of the Institution are in a most satisfactory state, the income having amounted to £196 11s. 11½d., a balance of £8 8s. 1d. being in the treasurer's hands after discharging all the liabilities. In concluding their report, the Committee offer their hearty congratulations on the progress made during the past year.

MEETINGS FOR THE ENSUING WEEK.

Mon. ...Medical, 8½. Clinical Discussion. The President, "A Case of successful Excision of the Elbow Joint;" Dr. Greenhalgh, Dr. W. Abbotts Smith, Dr. Gibb, Mr. Henry Lee, and others will furnish communications.
R. Asiatic, 3.
Royal United Service Inst., 8½.
Tues. ...Civil Engineers, 8. Discussion upon "The Perennial and Flood Waters of the Upper Thames." And, if time permits, Mr. J. G. Fraser, "Description of the Lydgate and Buckhorn-Weston Railway Tunnels."
Statistical, 8. Mr. C. Walford, "On the Recent Financial and Taxation Statistics of the United States."
Pathological, 8.
Ethnological, 8. 1. Mr. Robert Swinhoe, "Ethnological Notes on Formosa." 2. Mr. John Crawfurd, "On the Commixture of Races—Western Asia."
Royal Inst., 3. Prof. Marshall, "On Animal Mechanics."
Wed. ...Society of Arts, 8. Mr. Charles B. King, "On the Suppression and Extinction of Fires."
Meteorological, 7.
Geological, 8. 1. Dr. Harvey B. Holl, "On the Correlation of the several divisions of the Inferior Oolite in the Middle and South of England." 2. Mr. James Fergusson, "On Recent Changes in the Delta of the Ganges." Communicated by the President.
London Inst., 7.
Royal Horticultural. Camelia Show, 1. Floral Committee, 10. Fruit Committee, 10.
Thurs...Royal, 8½.
Antiquaries, 8½.
Linnæan, 8. 1. Dr. M. T. Masters, F.L.S., "Description of some Remarkable Malformations affecting the genus *Lolium.*" 2. Mr. A. Adams, F.L.S., "On the Species of *Fusidæ* which inhabit the Seas of Japan."
Chemical, 8. 1. Prof. Abel, "On Native Coppers." 2. Dr. Divers, "Decomposition of Gun-cotton." 3. Mr. C. Greville Williams, "Chenoline Series." 4. Dr. Attfield, "Oxamide."
Numismatic, 7.
Royal Soc. Club, 6.
Royal Inst., 3. Dr. E. Frankland, "On Chemical Affinity."
Fri.......Royal Inst., 8. Mr. Balfour Stewart, "On Magnetic Forces."
Philological, 8.
R. Horticultural. Council, 11. Election of Fellows, 2.
Sat.......Royal Inst., 3. Professor Max Muller, "On the Science of Language."

PARLIAMENTARY REPORTS.

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SESSIONAL PRINTED PAPERS.

Delivered during the Vacation 1862.

Par. Numb.

Delivered on 14th and 16th February, 1863.

4. Scottish Universities—Paper.
26. Bank of England—Paper.
8. Government Houses, &c.—Return.
25. Bank of England—Annual Accounts.
28. Navy Estimates.
9. Bills—Births and Deaths Registration (Ireland).
16. „ Telegraphs.
17. „ Union Relief Aid Act (1862) Continuance.
14. „ Church Rates Commutation.
15. „ Aggravated Assaults on Women and Children.
Affairs of Rome—Further Paper.

Delivered on 17th February, 1863.

11. Flogging (Navy)—Return.
12. Military Reserve Fund—Return.
15. China—Return.
27. Mint—Account.
30. Navy (Steam and Sailing Ships)—Return.
34. Remission of Sentences—Return.
6. Bills—Railway Bills.
18. „ Innkeepers' Liability (No. 1).

Delivered on 18th February, 1863.

35. Greek Loan—Account.
36. Sardinian Loan—Account.
39. Coroners' Inquests—Return.
19. Bills—Ballot at Municipal Elections.
20. „ Malt Duty.
21. „ Tobacco Duties.
23. „ Thames Embankment (North Side).
Affairs of the Duchies of Holstein, Lauenburg, and Schleswig—Correspondence.

Delivered on 20th February, 1863.

16. Army Commissions—Return.
31. East India (Loan)—Return.
32. East India (Revenues)—Return.
37. Russian Dutch Loan—Account.
38. Naval Receipt and Expenditure—Account.
44. Exchequer, &c.—Accounts.
47. Committee of Selection—First Report.
29. Railway and Canal, &c., Bills—Board of Trade General Report.

PATENT LAW AMENDMENT ACT.

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APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, February 27th*, 1863.]

Dated 18th February, 1863.

441. J. Barker and E. Moss, Manchester—Imp. in portable and stationary crabs or cranes.
443. J. H. Bly, Great Yarmouth—Imp. in cooking stoves.
447. F. J. Reed, 3, Gresham-street—Imp. in apparatus for traversing guns. (A com.)
449. J. Puntis, Southampton, and G. Cox, Throgmorton-street—Improved appliances for displaying in the open air or indoors illuminated designs, devices, mottoes, or announcements, and in which jets of gas are employed as the illuminating agent.

[*From Gazette, March 6th*, 1863.]

Dated 23rd October, 1862.

2851. J. T. Stroud, Birmingham—Imp. in lamps for general and special purposes and in parts connected with the same.

Dated 11th November, 1862.

3039. H. Burridge, 15, Grenville-street, Brunswick-square—Imp. in apparatus for extinguishing fires, applicable also for ventilating and fumigating, and for supplying, delivering, and distributing fluids.

Dated 29th December, 1862.

3469. W. Billinghurst and J. Requa, Rochester, U.S.—An improved portable battery.

Dated 6th January, 1863.

43. J. Eckersley, Westhoughton, Lancashire—Imp. in looms for weaving.

Dated 9th January, 1863.

83. W. Tasker, Waterloo Iron Works, near Andover—Imp. in the construction of harrows.

Dated 19th January, 1863.

165. B. Van der Mark, 8, Great John-street, Manchester—A new and improved musical instrument of the harmonica class.

Dated 26th January, 1863.

230. A. L. Liétout, Paris, and J. B. Roisin, 56, Rue de Sablonville, Neuilly, Paris—Imp. in gymnastical apparatus.

Dated 31st January, 1863.

285. J. Lightfoot, Accrington, and F. Trachsel, Manchester—Imp. in machinery or apparatus used in the process of distillation.

Dated 4th February, 1863.

320. C. Faulkner, D. Faulkner, and J. Fairley, Birmingham, and W. C. Stiff, Edgbaston, near Birmingham—Imp. in the manufacture of gun barrels.

Dated 7th February, 1863.

347. C. Parigot and A. Grivel, 29, Boulevart St. Martin, Paris—Imp. in locks.

Dated 12th February, 1863.

379. F. Oppenheim, 379, Strand—An improved plastic compound for dental purposes, to be used instead of wax, gutta percha, or resinous gums, in taking the impression of the mouth (Partly a com.)

Dated 13th February, 1863.

388. J. Jones, Liverpool—Imp. in the manufacture of lead, tin, and other metals, or amalgamation of metals of a like fusible nature into sheets of any required thickness and length, and also coating one or both sides of pipes and sheets of lead and other metal or amalgamation of metals with tin or other substances, and in the apparatus connected therewith.
390. J. Robertson, Dumbarton—Imp. in apparatus or means for printing woven fabrics by blocks.
392. W. Robertson, Manchester—Imp. in machines for spinning and doubling.
393. G. Wrigley and S. Morris, Dukinfield, Cheshire—Imp. in machines for spinning and doubling.
394. O. H. Hodge, Shoreditch—Imp. in hat brims, in the manufacture of hat brims, and in the apparatus or machinery used in such manufacture.
396. S. Whitaker, Craddock-street, Haverstock-hill—Imp. in indicating the positions and conditions of railway signals and points, and in the apparatus employed therein.

Dated 14th February, 1863.

398. R. Baguley, Greenlow Mill, Blackburn—Imp. in the construction of creels for warping machines, and other machines to which creels are applied.

400. W. C. Paul and A. T. Shore, Queen's-road, Bayswater—Imp. in the mode of constructing spring mattresses and other such articles for sitting or reclining upon.
401. J. S. Gisborne, Birkenhead, and W. Simpson, Liverpool—Imp. in means for rendering ships and other compasses insensible to local attraction.
402. H. Dembinski, Rue de l'Oratoire du Roule, No. 13, Paris—A new motive apparatus and processes proper for giving to it a continuous motion and unlimited strength.
404. W. Wood, Aston-under-Lyne—Certain imp. in cutting or producing screws or threads, and in apparatus connected therewith.
406. J. H. Walsh, Kensington—Imp. in breech-loading fire-arms, and in the cartridge cases to be used therewith.
408. W. Clark, 53, Chancery-lane—Imp. in the method of and apparatus for separating the fibres of straw, wood, and other vegetable substances, and extracting the gummy and colouring matters therefrom, to render them fit for paper stock, or for other purposes. (A com.)
410. J. Higgins and H. Higgins, Salford—Imp. in carding engines, and in apparatus connected therewith.
412. J. Morgan, 23, Stephen's-green North, Dublin—Imp. in embalming and preserving from decay human bodies and bodies of other animals, also pickling, curing, and flavouring animal bodies.

Dated 16th February, 1863.

416. C. D. Abel, 20, Southampton-street, Chancery-lane—An improved omnibus. (A com.)
418. J. B. Watts, Birmingham—Imp. in the manufacture of matchets and swords.
420. R. A. Brooman, 166, Fleet-street—An improved cover or protection for steel and other metal springs, ribbands, and hoops. (A com.)
422. J. H. Haywood and W. Vernon, Nottingham—Imp. in packing bonnet fronts, rouches, and other similar articles.
424. W. Nalder, Challow Works, Wantage—Imp. in rotatory screens, and in the machinery or apparatus employed in the manufacture of such screens.

Dated 17th February, 1863.

426. T. W. Salmon, Mile End Old Town—Imp. in washing machines.
428. W. T. Dibb, Hull—An imp. in brewing.
430. J. Gimson, Leicester—Imp. in presses for punching or cutting out leather and other substances.
432. J. Durant, Sussex-street, St. Pancras—Imp. in chimney tops.
434. J. W. Lane, Caledonian-road—Imp. in fastenings for studs, sleeve fasteners, solitaires, bracelets, brooches, and other uses.
436. H. Tomlinson, Rotherham—Imp. in stoves or fireplaces for warming apartments.

Dated 18th February, 1863.

438. E. Strawson, 9, Royal Arcade, New Oxford-street—Imp. in the manufacture of buttons, which may be instantaneously attached without sewing.
439. G. K. Geyelin, 13, Chenies-street—An improved grate whereby the perfect combustion of the various compounds of coal is produced.
440. M. Siegrist, Ewell, Surrey—An improved atmospheric brake or break.
442. J. F. Spencer, Newcastle-upon-Tyne—Imp. in apparatus for regulating and working the valves of steam and other engines.
444. F. Johnston and R. Heatley, Blackburn—Certain imp. in looms for weaving.
446. G. T. Bousfield, Loughborough-park, Brixton—Imp. in breech-loading fire arms. (A com.)

Dated 19th February, 1863.

452. T. Markland, Hyde, Cheshire, and J. C. Dickinson, Blackburn—Certain imp. in machinery or apparatus for warping or beaming yarns or threads.
454. L. A. Pouget, 39, Rue St. Sebastien, Paris—Imp. in the manufacture of oil lamps.
456. J. J. Badart, 95, Bishopsgate-street—Imp. in the preparation of cotton seed cake.
458. N. Thompson, 15, Abbey-gardens, St. John's-wood—Imp. in apparatus for stopping bottles, jars, and other vessels, and in tools for producing parts of such apparatus.

Dated 20th February, 1863.

462. C. Billingsley, Manchester—Imp. in saddlery, harness, driving straps, and similar articles.
464. C. W. Siemens, 3, Great George-street, Westminster—Imp. in insulating and supporting telegraph line wires.
466. R. Bell, Gracechurch-street—Imp. in armour plating or protecting ships and vessels.
470. W. Husband, Hayle, Cornwall, and J. Quick, Sumner-street, Southwark—Imp. in apparatus for raising sewage and water.

Dated 21st February, 1863.

472. R. Thompson, Wigan, Lancashire—Imp. in apparatus for moulding.
474. F. J. Manceaux, Paris—Imp. in fire-arms, or in transforming arms of large calibre into arms of smaller calibre.
476. R. V. Dodwell, Manchester—An improved method of preventing the destruction of plants by insects and certain descriptions of animals, and in the means for effecting the same.
478. A. Ceileur, Shawbury-villas, Camden-road—Imp. in apparatus for taking photographic impressions or likenesses by means of the camera.
480. H. Mackinder, Mere-hall, Lincoln—Imp. in apparatus for separating potatoes into different sizes.
482. A. Dugdale, Rue de Courcelles, Paris—Imp. in throttle valves.

Dated 23rd February, 1863.

486. E. T. Hughes, 123, Chancery-lane—Imp. in the process of cleaning organic matter. (A com.)
488. R. A. Brooman, 166, Fleet-street—Imp. in dressing millstones, in ornamenting or engraving on glass, pottery, and other similar substances, and in materials employed therein. (A com.)
490. J. D. Welch and A. P. Welch, Gutter-lane—Imp. in machinery for blocking and pressing hats and bonnets.
492. T. R. Harding, Leeds—Imp. in machinery for carding and combing flax, wool, cotton, and other fibrous substances.
494. J. Tatham, Rochdale—Imp. in machinery or apparatus for preparing cotton and other fibrous materials for spinning.

Dated 24th February, 1863.

500. J. Hawthorn, Burslem, Staffordshire—Certain imp. in handles for doors, drawers, and other means of enclosure.
504. J. Le-Butt, Bury St. Edmunds—Imp. in machinery for dressing grain.
506. D. B. Chatterton, Chester, Cheshire—Improved brick-making machinery.
508. H. B. Willson, Montague-place, Russell-square—Imp. in the construction of war and merchant ships.
510. A. Junger, Hamburg—An improved *life-preserving* garment.
512. R. W. Thomson, Edinburgh—Imp. in obtaining and applying motive power, which imp. or parts thereof are applicable for raising, forcing, and measuring fluids.
514. W. Clark, 53, Chancery-lane—Imp. in sewing machines. (A com.)

Dated 25th February, 1863.

516. H. Wilde, Manchester—Imp. in electro-magnetic telegraphs.
520. J. Fitter, Birmingham—An imp. or imps. in the construction of castors for tables, chairs, and other furniture or other articles.
522. E. B. Wilson, 5, Parliament-street, Westminster—An imp. or imps. in the manufacture of an alloy or alloys of titanium and iron.
524. B. Lawrence and W. Niblett, Newport, Monmouthshire—Imp. in apparatus for regulating the flow of gas for purposes of illumination.
530. W. Hudson and C. Catlow, Burnley, Lancashire—Imp. in looms for weaving.
534. G. Tomkins, Morriston, Glamorganshire—Imp. in the manufacture of tin and terne plates, and in the apparatus to be employed therein.

Dated 26th February, 1863.

536. H. W. Brown, Walham-green—Imp. in window frames, and in glazing windows.
538. G. H. Lilley, Dalston—Imp. in apparatus for connecting and securing together planks of wood, applicable to the building and caulking of ships and other vessels.
542. J. Yates, Rotherham—Imp. in the manufacture of armour plates or blocks for defensive purposes.
544. W. Clark, 53, Chancery-lane—Imp. in the manufacture o buttons, and in apparatus for the same. (A com.)
546. J. Humby, 14, Gresham-house, Old Broad-street—Imp. in furnaces and apparatus for manufacturing oxide of zinc or zinc white. (A com.)
548. F. H. Twilley, Dean-street, Soho—Imp. in book slides or holders.

PATENTS SEALED.

[*From Gazette, March 6th*, 1863.]

February 24th.

30. W. E. Newton.

March 6th.

2480. F. Selby.
2484. J. Saunders.
2485. J. Saunders.
2495. W. A. Munn.
2497. G. Weeks.
2500. J. Hemsley.
2501. R. A. Brooman.
2503. L. C. Hoyau.
2514. J. R. Johnson and J. S Atkinson.
2518. A. J. Moreau.
2519. H. Higgins.
2520. G. Bedson.
2525. T. W. Cowan.
2562. J. W. Woodford.
2634. M. Henry.
2720. M. A. F. Mennons.
3336. J. W. Baker.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, March 10th*, 1863.]

March 2nd.

808. A. Pentzlin.

March 3rd.

600. J. H. Johnson.
699. W. Weild.

March 4th.

602. T. W. Ashby & J. Coulson.
644. W. E. Newton.
880. W. Clark.

March 5th.

617. R. Pitt.

March 6th.

625. J. Imray and J. Copeland.
636. G. Spiller.
640. C. Sheldon.
650. J. H. Young.
776. J. M. Carter.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[*From Gazette, March 10th*, 1863.]

March 3rd.

609. G. Rees.

March 5th.

893. A. V. Newton.

March 6th.

626. R. W. Winfield, J. Simms, and T. Lloyd.